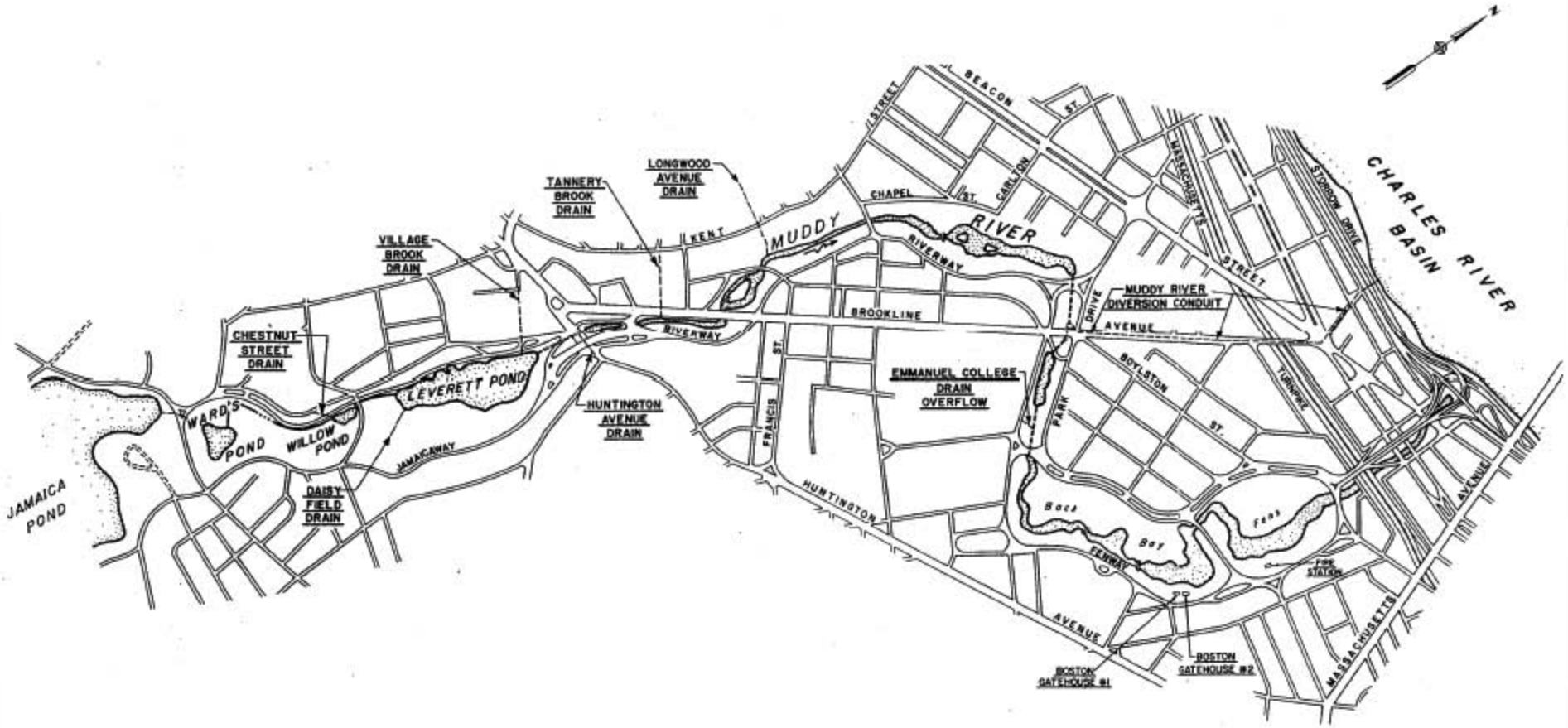
Muddy River Flood Damage Reduction and Ecosystem Restoration Project

November 3, 2011

Mike Keegan

Project Manager

New England District

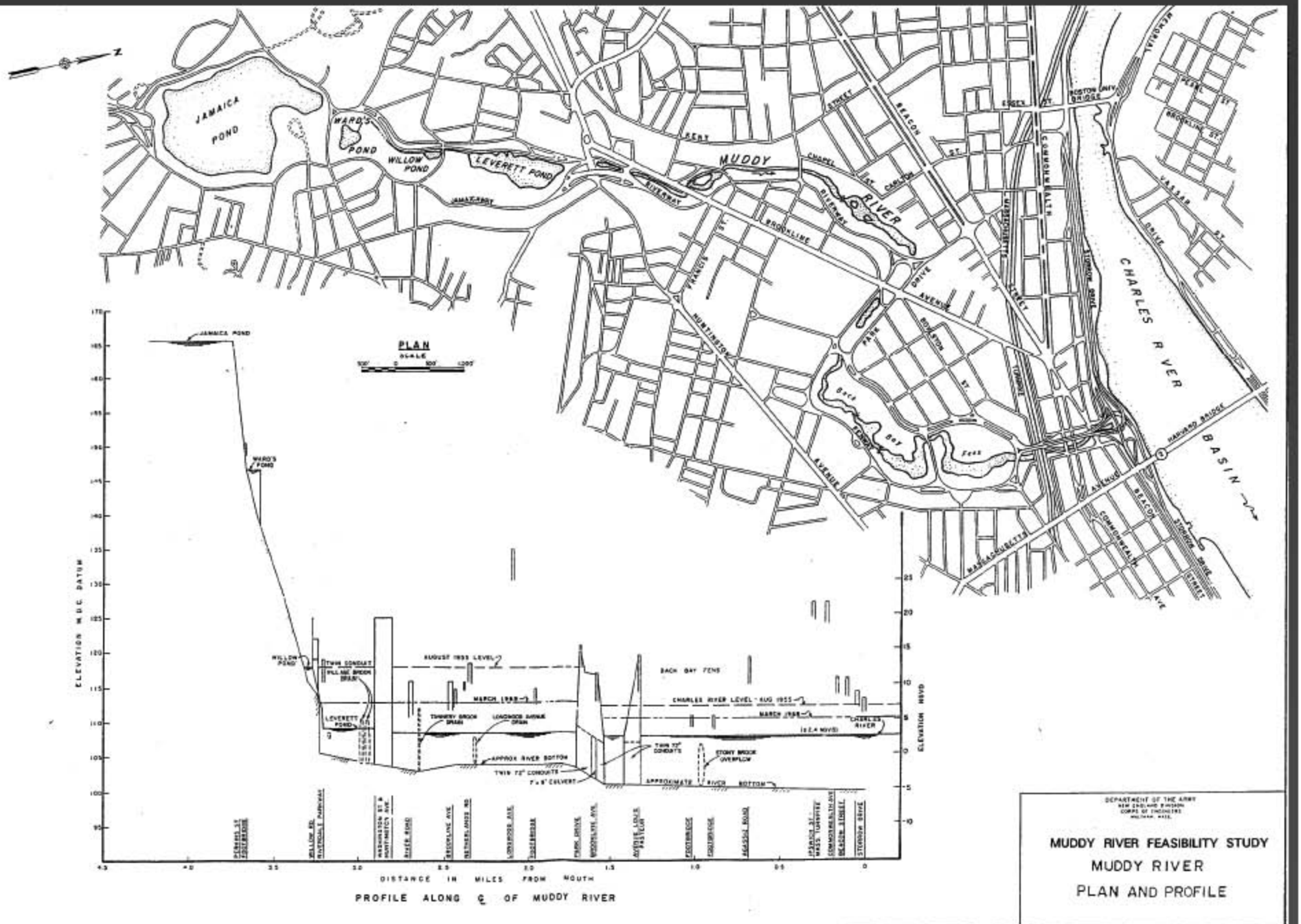


DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION
CORPS OF ENGINEERS

MUDDY RIVER FEASIBILITY STUDY

MUDDY RIVER

DETAILED VICINITY MAP

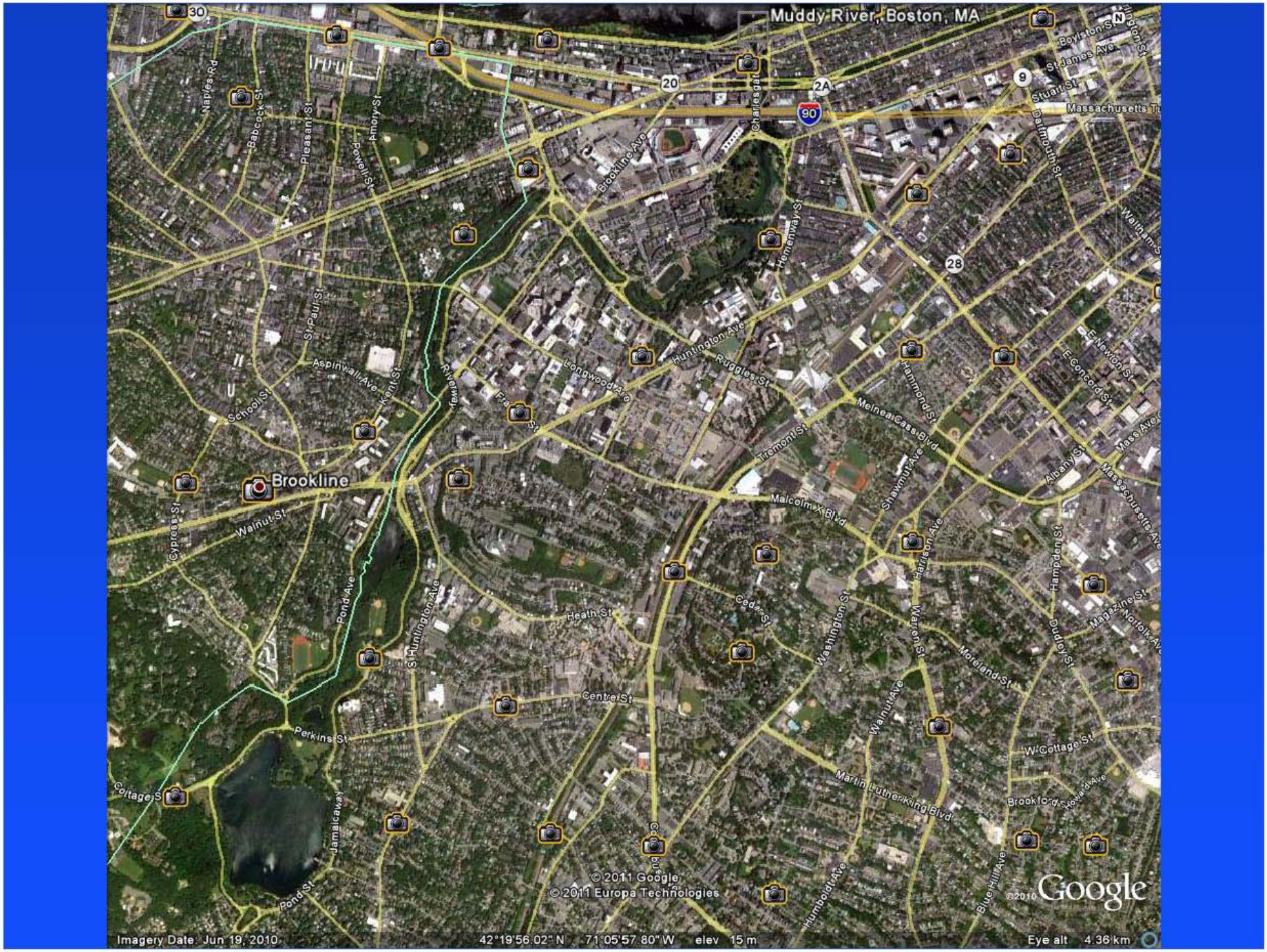


DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION
CORPS OF ENGINEERS
WALTHAM, MASS.

MUDDY RIVER FEASIBILITY STUDY

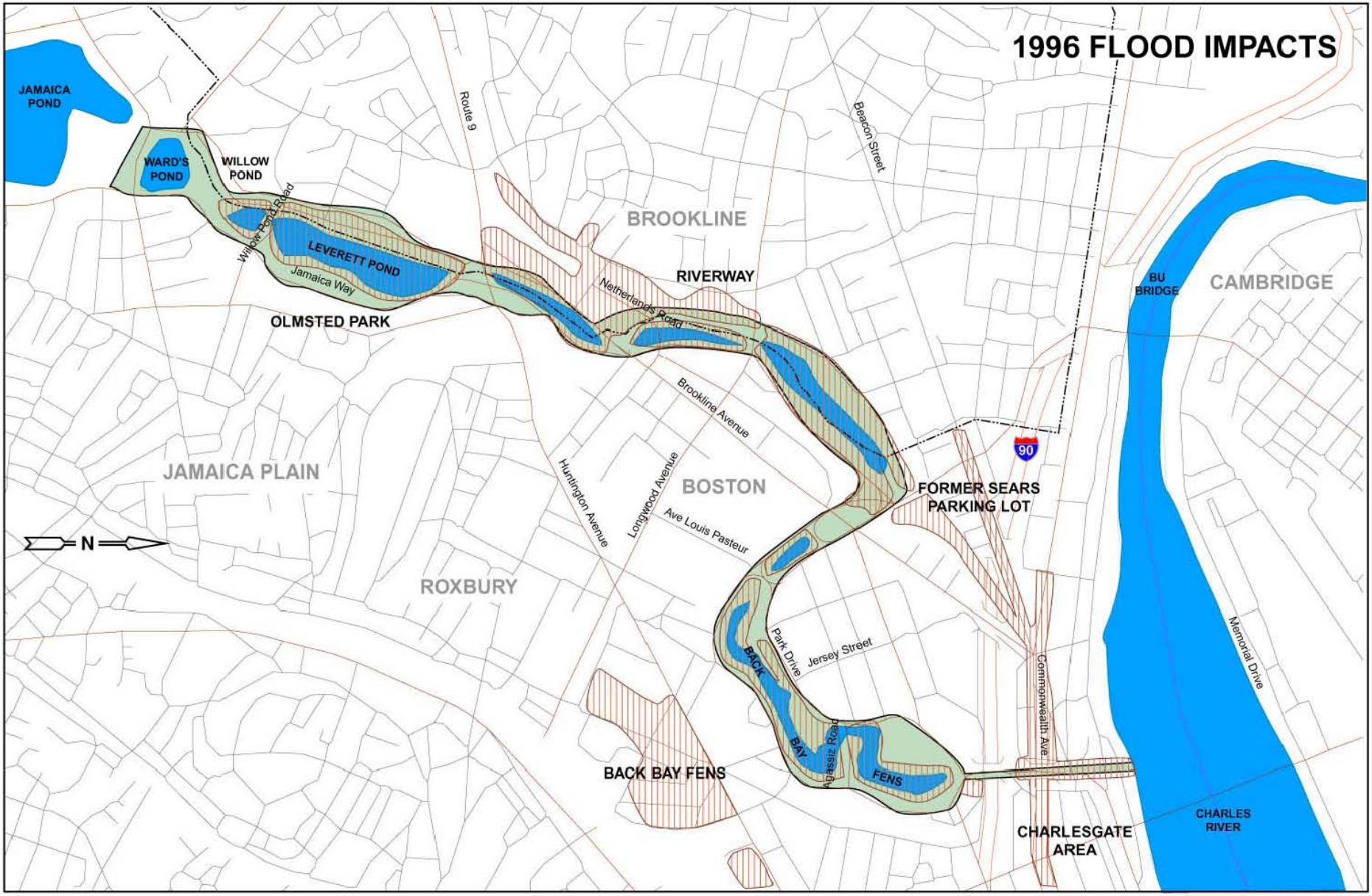
MUDDY RIVER

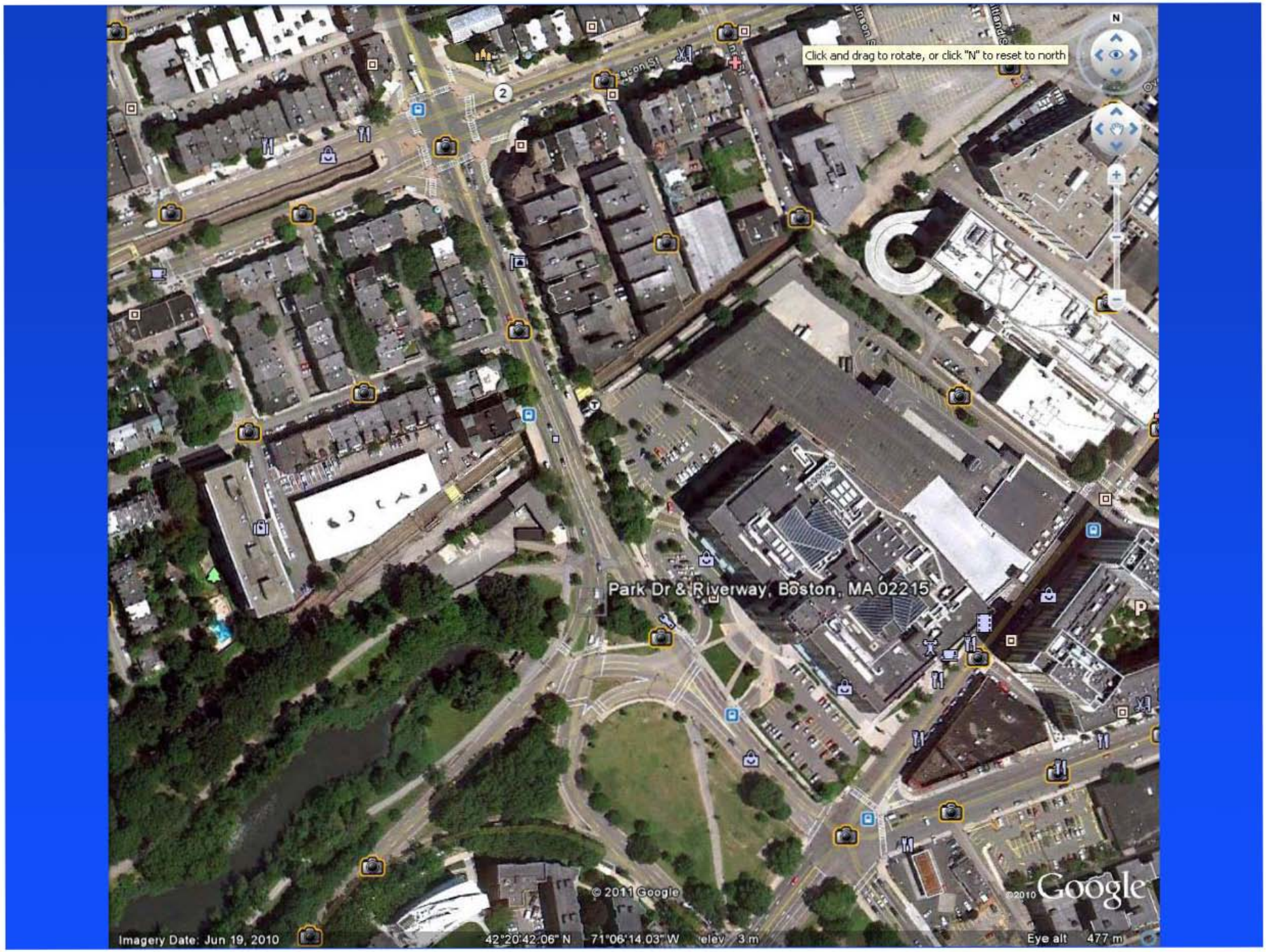
PLAN AND PROFILE


Muddy River, Boston, MA
Brookline
Boylston St
St James Ave
Stuart St
Massachusetts Tu
Dalmouth St
Charlesgate
Brookline Ave
Hemenway St
Naples Rd
Babcock St
Pleasant St
Powell St
Amory St
St Paul St
Aspinwall Ave
Kent St
School St
Riverway
Longwood Ave
Huntington Ave
Ruggles St
Fenway
Hammond St
Melnea Cass Blvd
Tremont St
Shawmut Ave
Albany St
Mass Ave
E Newton St
E Concord St
Malcolm X Blvd
Harrison Ave
Hampden St
Magazine St
Norfolk Ave
Cypress St
Walnut St
Pond Ave
S Huntington Ave
Heath St
Cedar St
Washington St
Warren St
Moreland St
Dudley St
Centre St
Perkins St
Walnut Ave
W Cottage St
Martin Luther King Blvd
Brookford St
Howard Ave
Cottage St
Jamaicaway
Pond St
Humboldt Ave
Blue Hill Ave
© 2011 Google
© 2011 Europa Technologies
©2010 Google
Imagery Date: Jun 19, 2010
42°19'56.02" N 71°05'57.80" W elev 15 m
Eye alt 4.36 km

Flood Problem

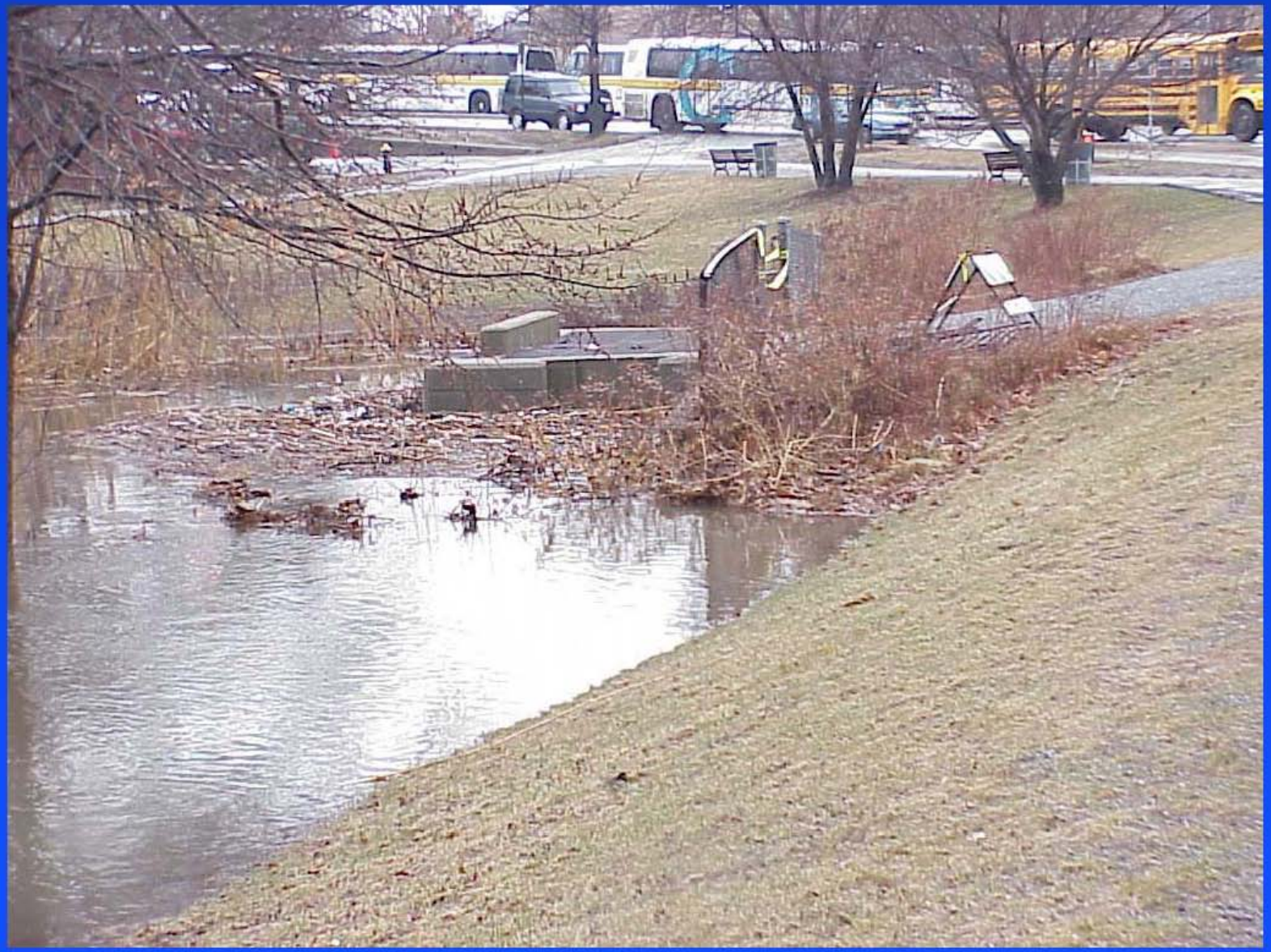
- Widespread flooding - October 1996 and June 1998.
- Major damage to public and private buildings including flooding at numerous universities (Northeastern, Simmons, Emmanuel and Wentworth), the Museum of Fine Arts and many others.
- Major damage to the MBTA transit system.
- Primary causes are undersized culverts and channel restrictions.


1996 FLOOD IMPACTS
JAMAICA POND
WARD'S POND
WILLOW POND
Willow Pond Road
LEVERETT POND
Jamaica Way
OLMSTED PARK
Route 9
BROOKLINE
Beacon Street
RIVERWAY
Netherlands Road
Brookline Avenue
JAMAICA PLAIN
Huntington Avenue
Longwood Avenue
BOSTON
Ave Louis Pasteur
FORMER SEARS PARKING LOT
90
BU BRIDGE
CAMBRIDGE
N
ROXBURY
Park Drive
Jersey Street
BACK BAY FENS
Agassiz Road
Commonwealth Ave.
Memorial Drive
CHARLESGATE AREA
CHARLES RIVER


Click and drag to rotate, or click "N" to reset to north
Park Dr & Riverway, Boston, MA 02215
© 2011 Google
©2010 Google
Imagery Date: Jun 19, 2010
42°20'42.06" N 71°06'14.03" W elev 3 m
Eye alt 477 m

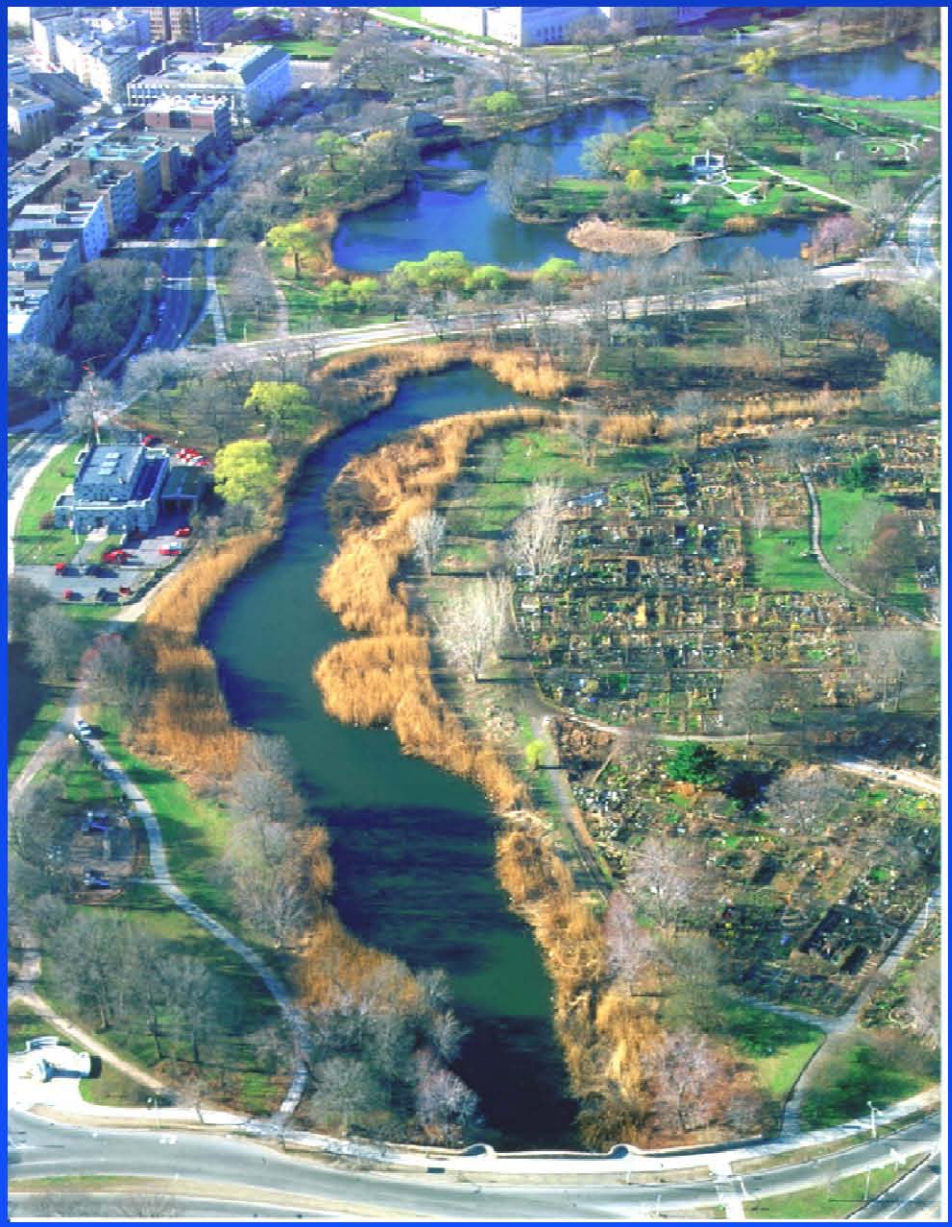
March 22, 2001 rainfall event

March 22, 2001 rainfall event



Environmental Problems

- **Accumulated sediment impacting aquatic and benthic habitats (High SOD, low DO).**
- **Contaminated sediments pose a risk to aquatic life and wildlife (metals, PCB's, PAH's).**
- **Invasive species *(Phragmites)* impacting riparian biodiversity and encroaching on open water.**
- **Aquatic weed *(fanwort)* infestation in the Fens.**



Recommended Plan Description

- Improvements to protect against a flood with a return frequency of 20 years to include channel improvements, removal of undersized culverts and installation of two new culverts.
- Daylighting 2 sections of river (700 LF).
- Environmental dredging of the river and ponds.
- Eradication of *Phragmites* from wetland and riparian areas.
- Preservation and restoration of the historic shoreline in construction areas.

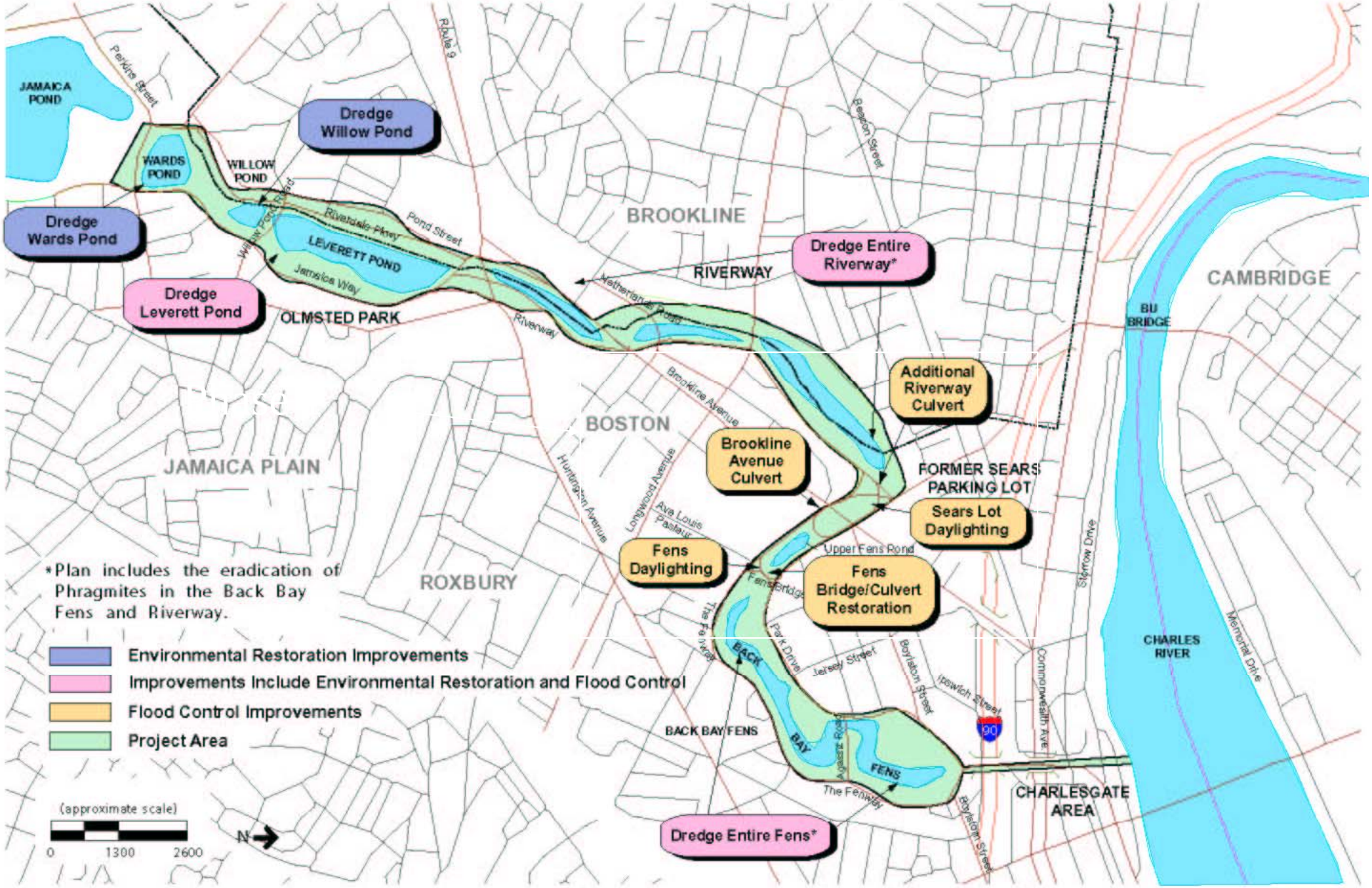


Figure 2: Recommended Plan

Plan Accomplishments

Flood Control

- Protects against recurrence of Oct 1996 Flood (20-Year Event)
- Significantly reduces flood stages for all events including tributaries

Environmental Restoration

- Restores over 40 acres of scarce urban aquatic habitat
- Restores anadromous fish spawning habitat (Fed. Significant Resource)
- Enhances diversity & productivity of benthic and warmwater fish communities
- Enhances biodiversity by eradicating extensive stands of *Phragmites*.

Plan Accomplishments

Flood Control

- Protects against recurrence of Oct 1996 Flood (20-Year Event)
- Significantly reduces flood stages for all events including tributaries

Stage Reductions @ Riverway for 20-Yr Project			
Frequency	Existing Flood Elevation (BCB)	Elevation with 20 - Year Plan	Stage Reduction (feet)
10-Year	16.5	13.2	3.3
20-Year	18.0	13.3	4.0
50-Year	21.0	16.5	4.5
100-Year	22.0	17.5	4.5

Plan Accomplishments/Benefits (con't)

- Other
  - Unique opportunity to combine flood damage reduction and ecosystem restoration in a highly urban environment.
  - Provides extensive benefits to public, institutional and social resources.
  - Enhances diversity and productivity of the benthic and warmwater fish communities.
  - Enhances value of over 140 acres of associated upland park areas.
  - Allows restoration of urban recreational fishery (PCB levels in fish reduced).

Public and Private Support

- Outstanding public and private support for the project.
- Unanimous consensus among agencies for a comprehensive solution.
- Parallel study underway to secure funding for associated work – Non Corps funds expended to date exceed $5 million.
- The initial phase of the Muddy River restoration (dredging and riparian restoration of the Charlesgate area) has been undertaken by the sponsors and is nearly complete.

Muddy River Design Phase

- Project is being broken into two Phases for design and construction.
- Phase 1 is located from Riverway to Avenue Louis Pasteur and consists of:
  - Riverway Culvert
  - Brookline Culvert
  - Daylighting of Sears lot and Fens area
  - Reconstruction of Avenue Louis Pasteur headwall

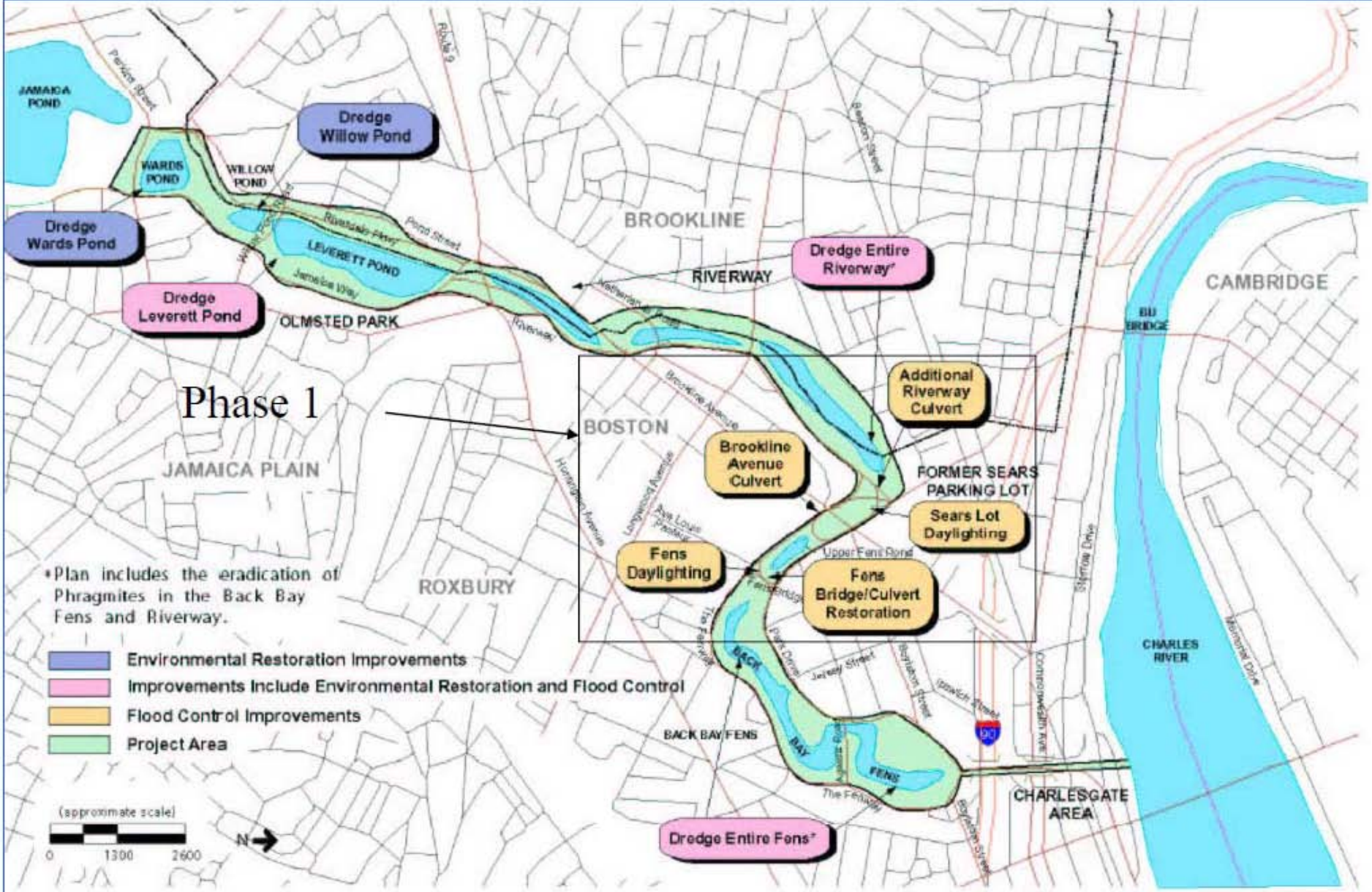


Figure 2: Recommended Plan

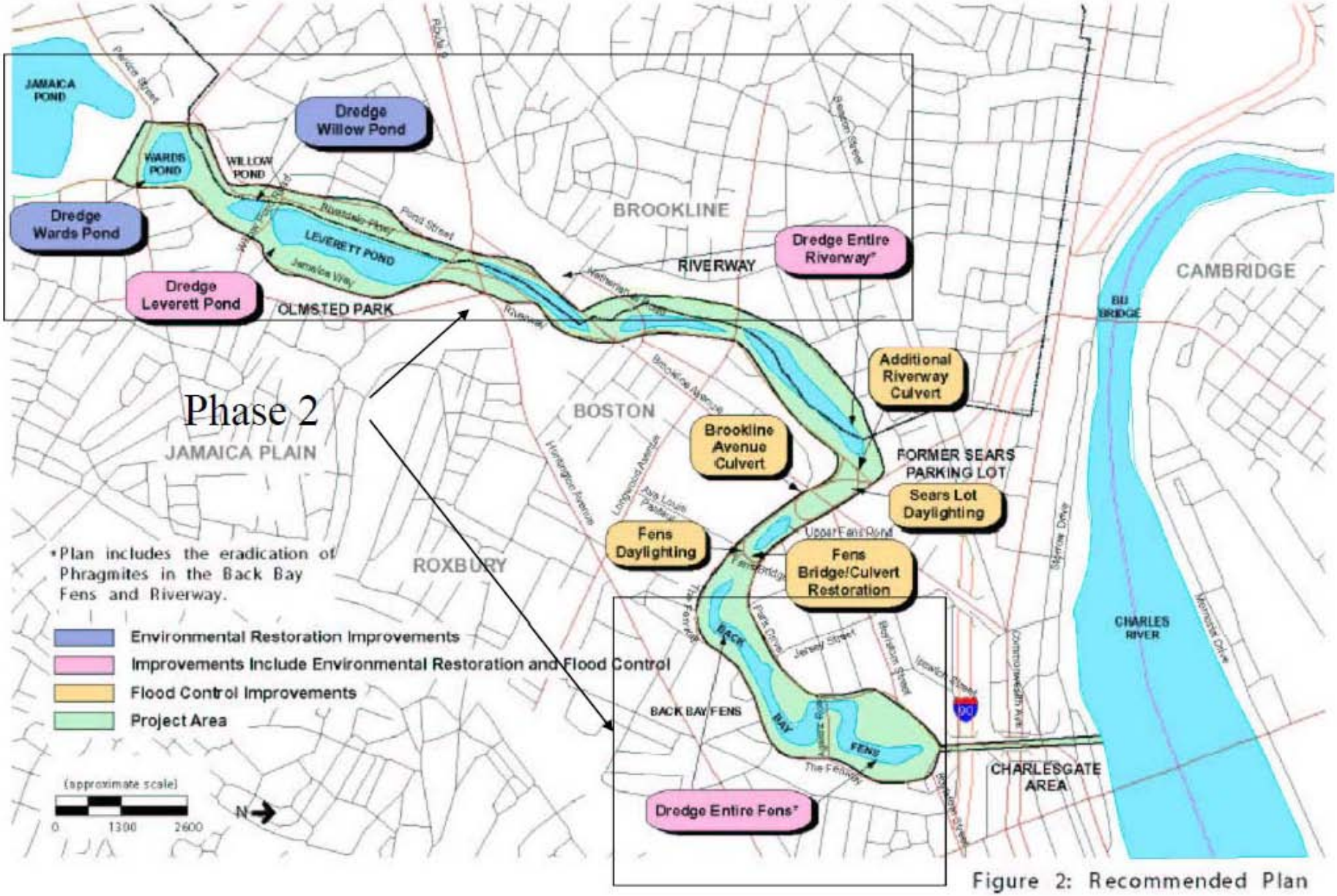


Figure 2: Recommended Plan

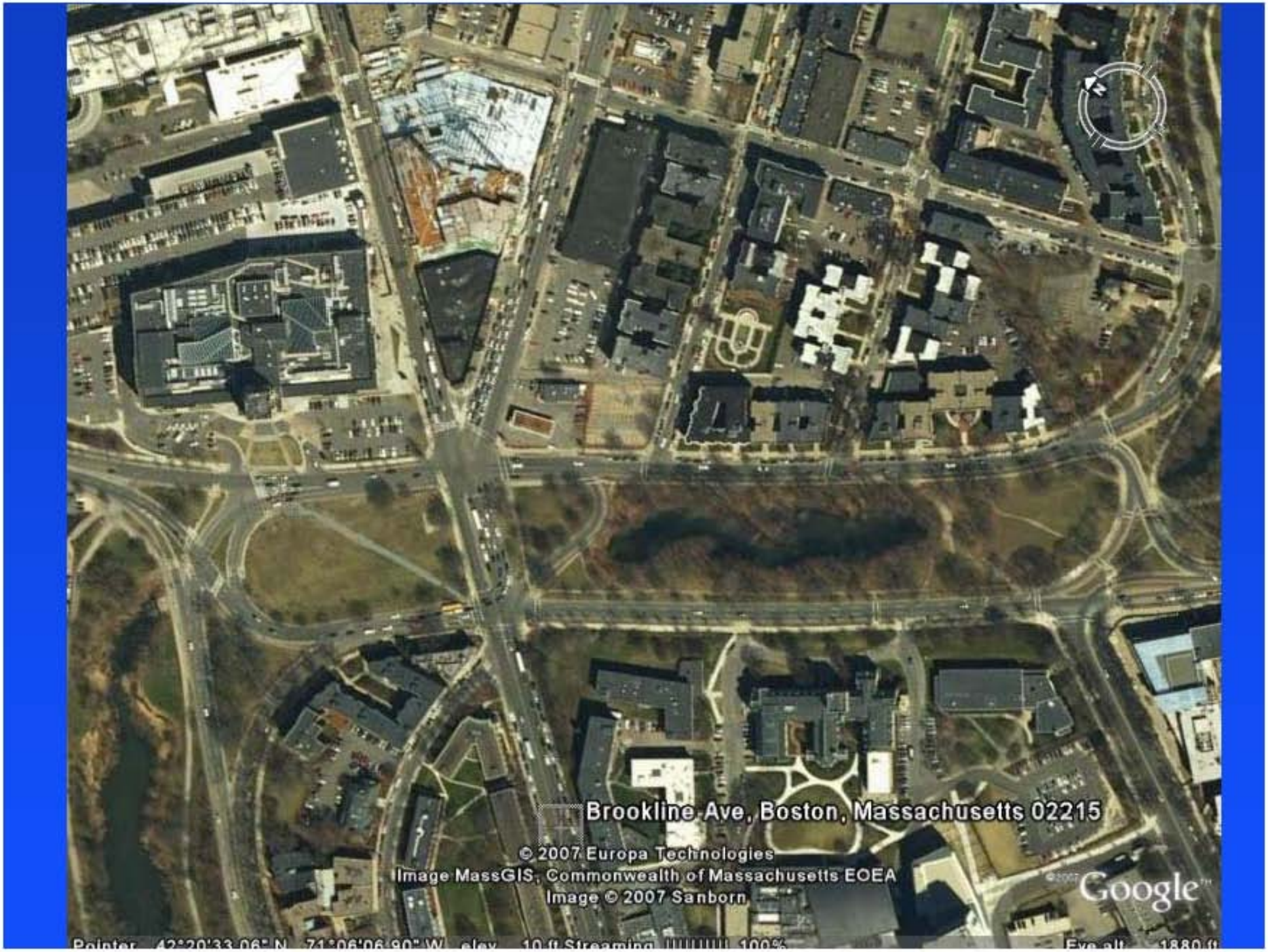

Brookline Ave, Boston, Massachusetts 02215
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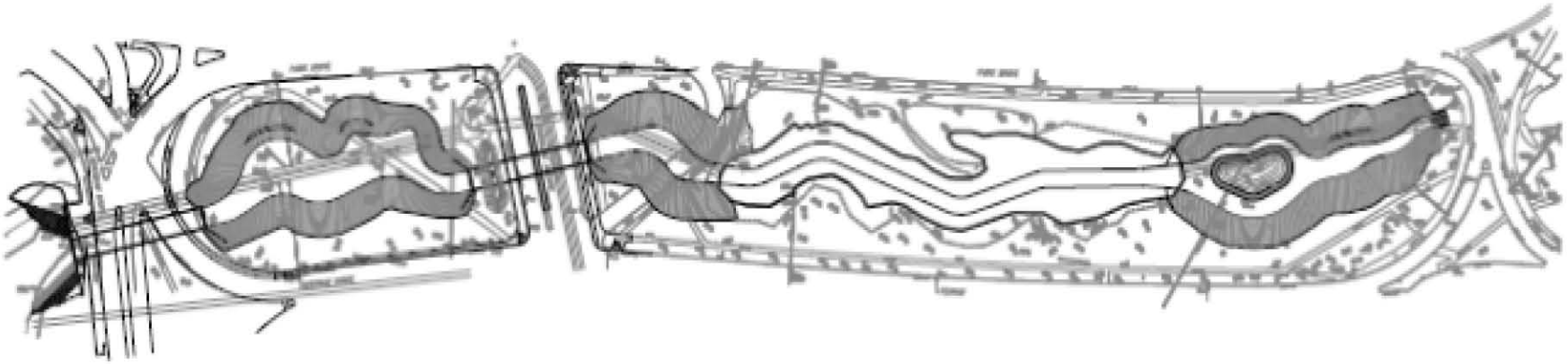
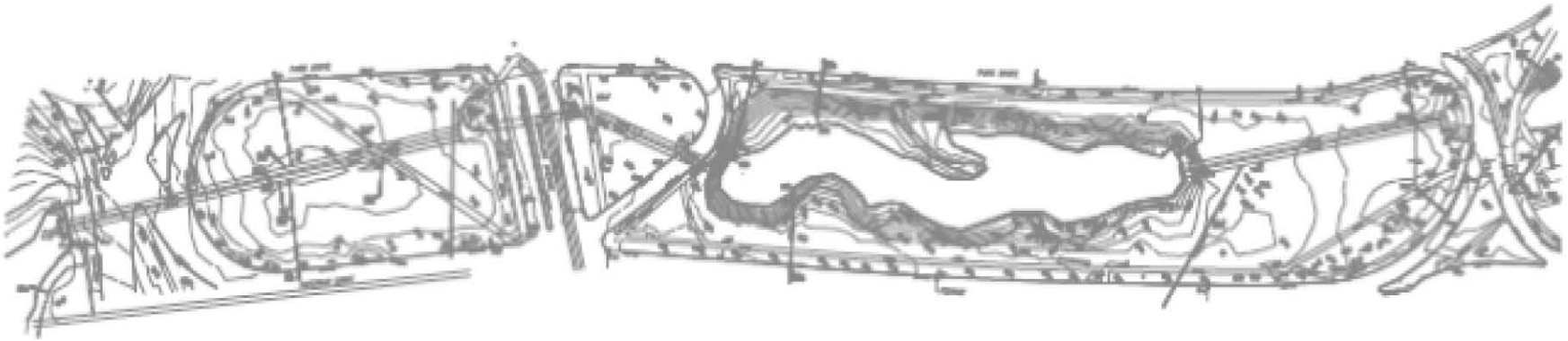
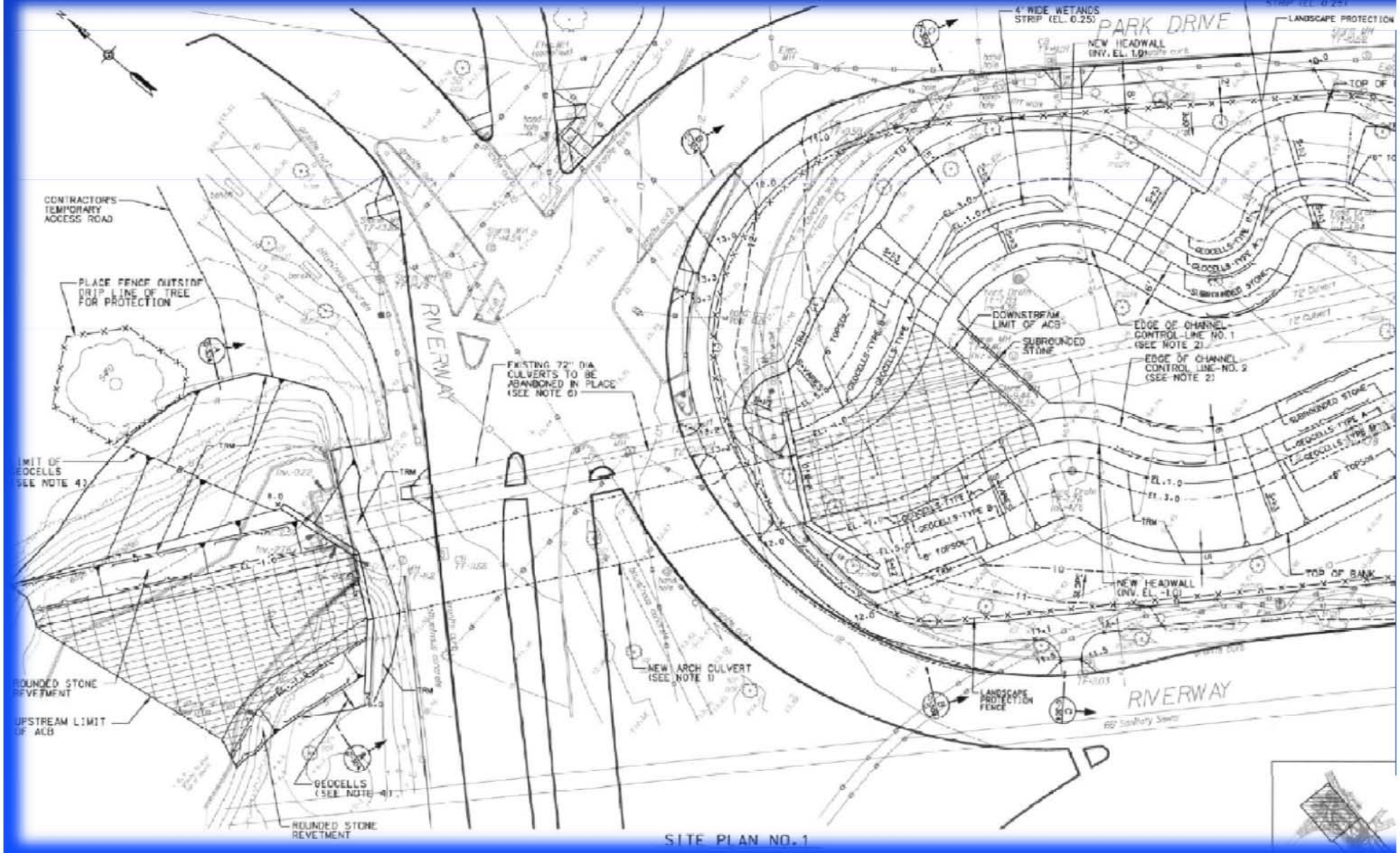
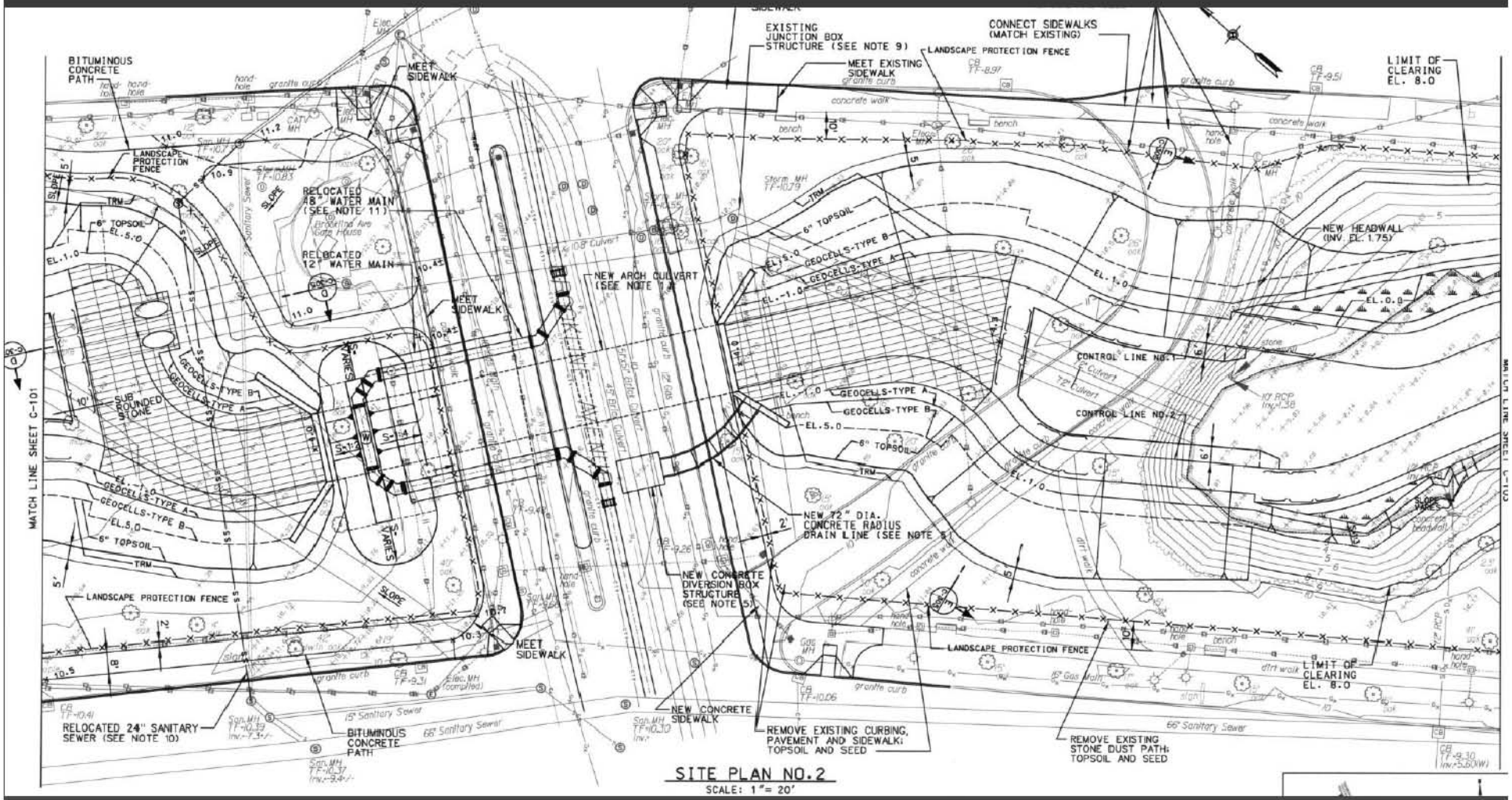
Image MassGIS, Commonwealth of Massachusetts EOEA
Image © 2007 Sanborn
Google





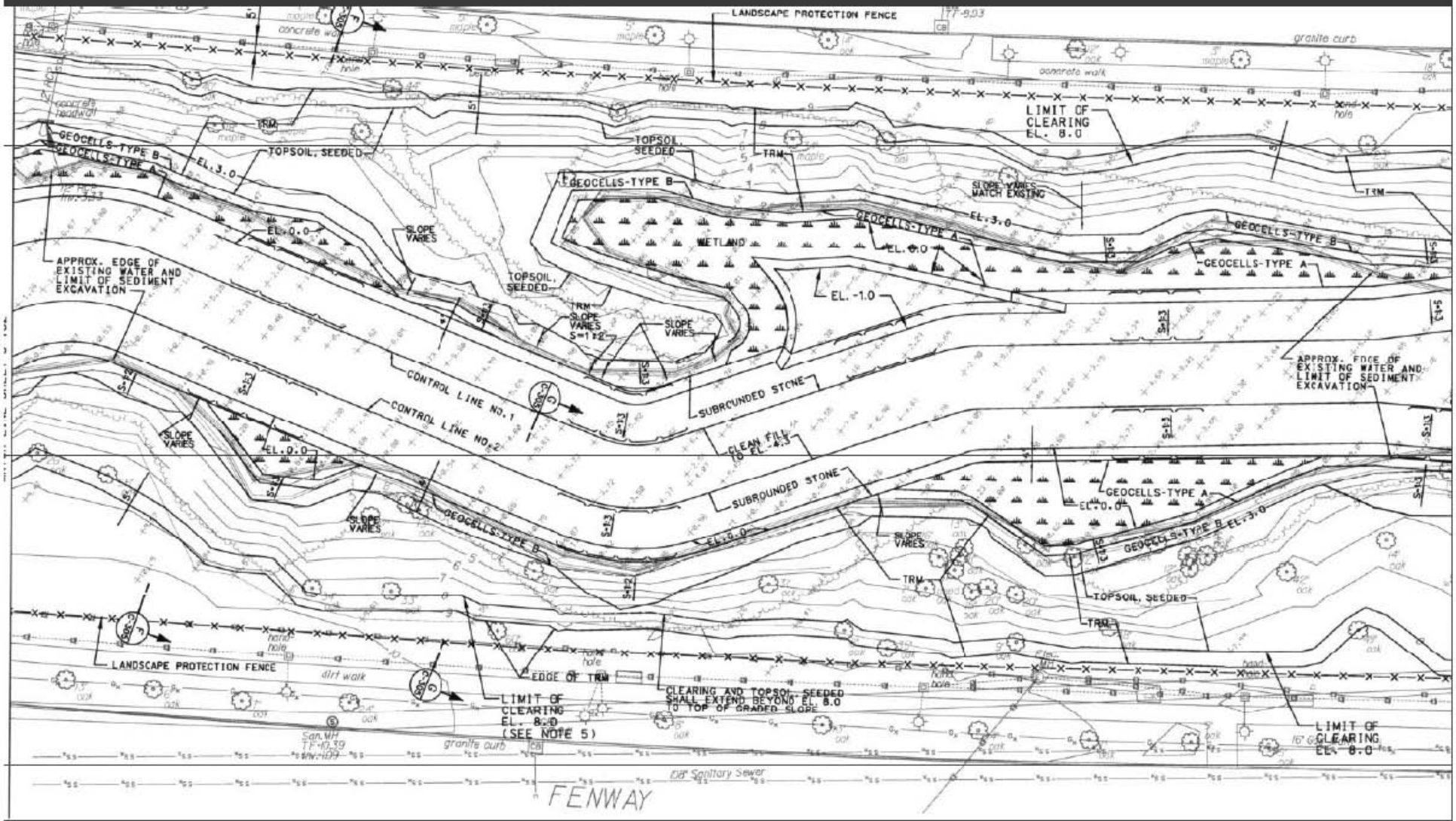


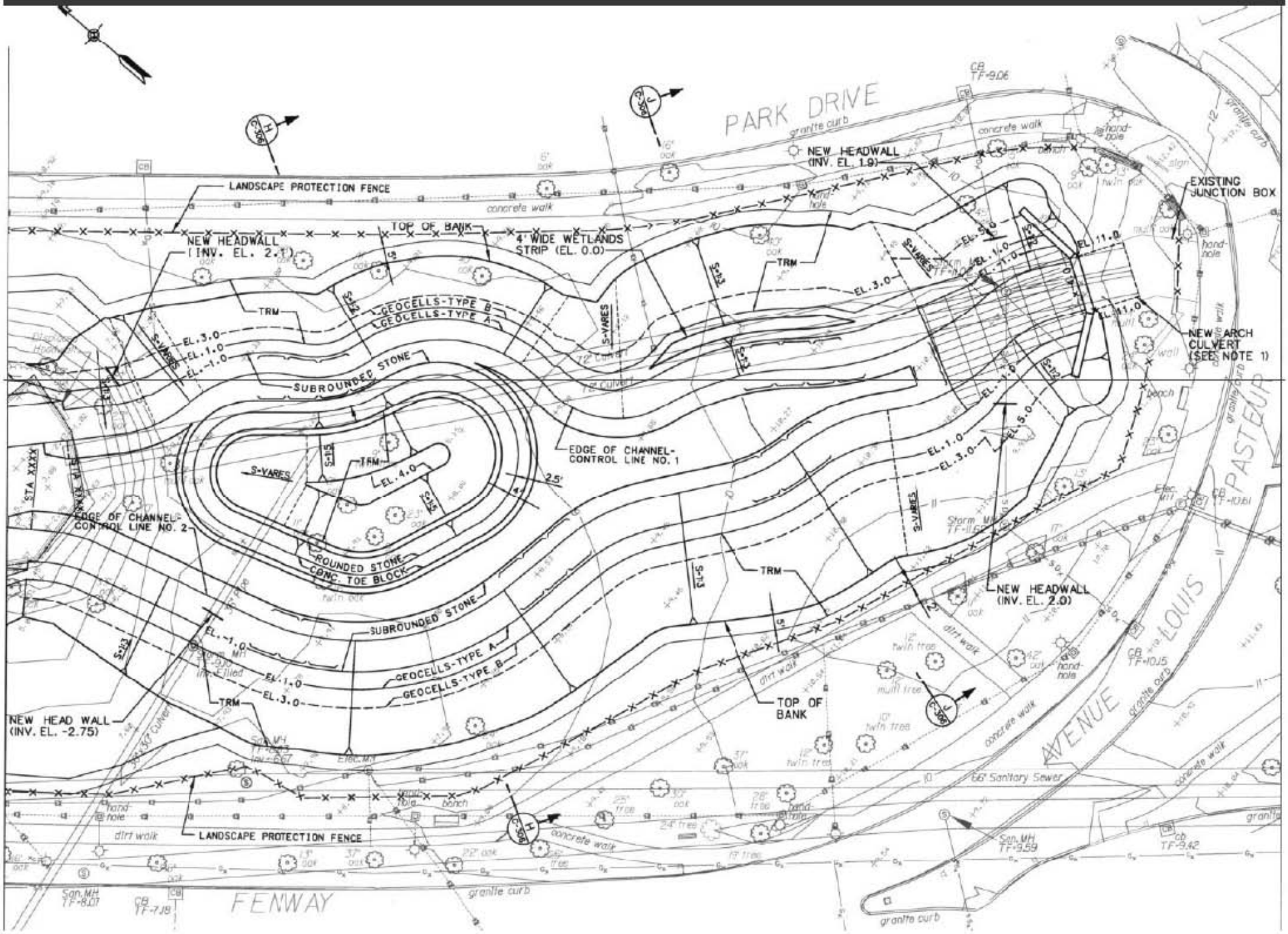
SITE PLAN NO. 1



SITE PLAN NO. 2

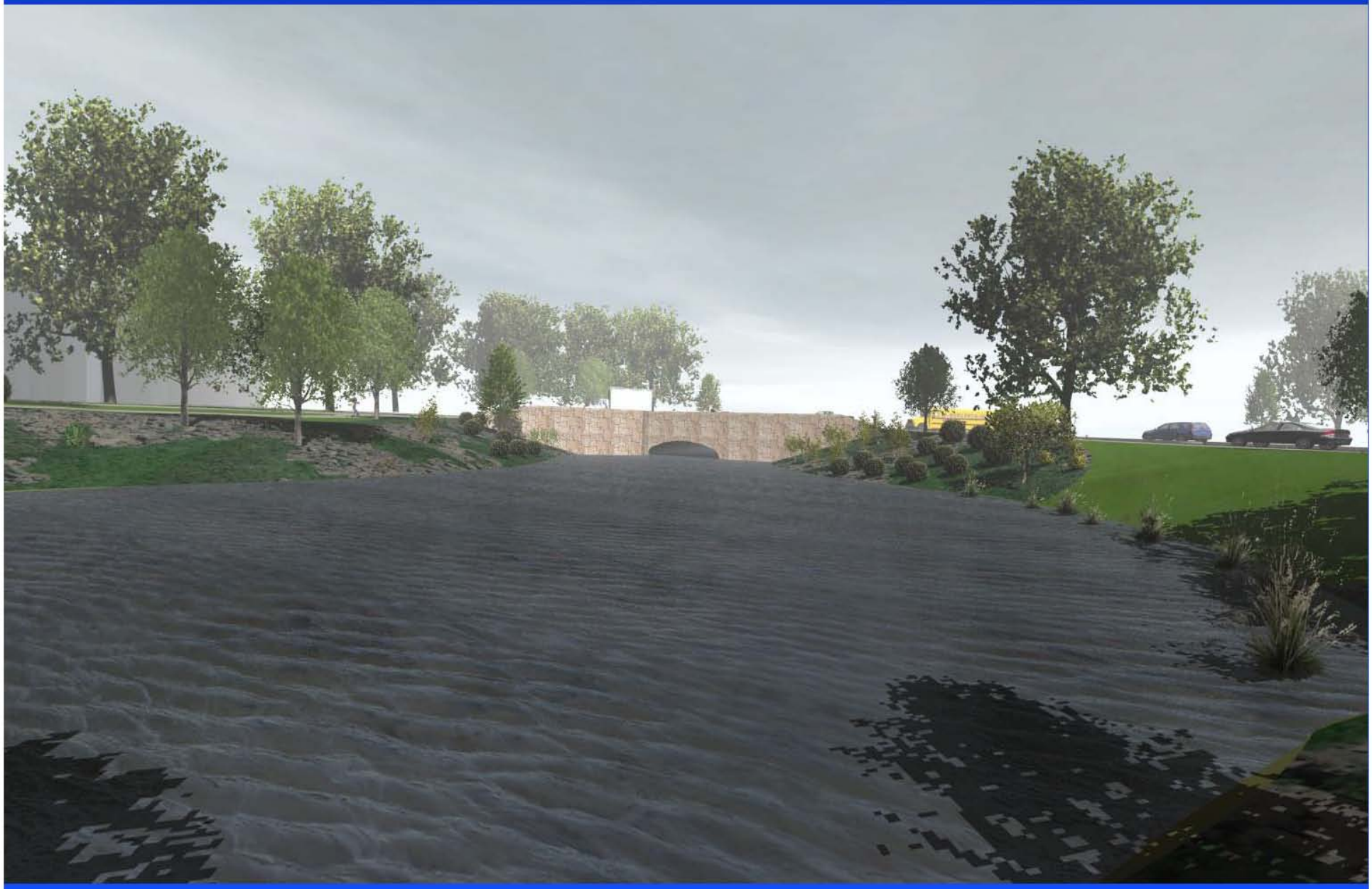
SCALE: 1" = 20'


LANDSCAPE PROTECTION FENCE
LIMIT OF CLEARING EL. 8.0
GEOCELLS-TYPE B
GEOCELLS-TYPE A
EL. 3.0
TOPSOIL, SEEDED
TRM
SLOPE VARIES
EL. 0.0
APPROX. EDGE OF EXISTING WATER AND LIMIT OF SEDIMENT EXCAVATION
WETLAND
EL. -1.0
SLOPE VARIES MATCH EXISTING
CONTROL LINE NO. 1
CONTROL LINE NO. 2
SUBROUNDED STONE
CLEAN FILL TO EL. 4.5
SLOPE VARIES 5=1 1:2
LIMIT OF CLEARING EL. 8.0 (SEE NOTE 5)
EDGE OF TRM
CLEARING AND TOPSOIL SEEDED SHALL EXTEND BEYOND EL. 8.0 TO TOP OF GRADED SLOPE
granite curb
concrete walk
dirt walk
FENWAY


PARK DRIVE
FENWAY
AVENUE LOUIS PASTEUR
NEW HEADWALL (INV. EL. 1.9)
LANDSCAPE PROTECTION FENCE
TOP OF BANK
4' WIDE WETLANDS STRIP (EL. 0.0)
NEW HEADWALL (INV. EL. 2.1)
EXISTING JUNCTION BOX
NEW ARCH CULVERT (SEE NOTE 1)
GEOCELLS-TYPE B
GEOCELLS-TYPE A
SUBROUNDED STONE
EDGE OF CHANNEL-CONTROL LINE NO. 1
EDGE OF CHANNEL-CONTROL LINE NO. 2
ROUNDED STONE
CONC. TOE BLOCK
NEW HEADWALL (INV. EL. 2.0)
NEW HEAD WALL (INV. EL. -2.75)
TOP OF BANK
LANDSCAPE PROTECTION FENCE
66" Sanitary Sewer
TRM
S-VARES
EL. 3.0
EL. 1.0
EL. -1.0
EL. 4.0
EL. 5.0
EL. 11.0
granite curb
concrete walk
dirt walk

Remaining Activities

- Completion of the Utility Relocations in Brookline Avenue – November 2011
- Acquisition of Right of Entry from Landmark Center for Relocation of Driveway – November 2011
- Final Approval of Traffic Management by Boston Traffic Department – November 2011
- Solicitation of Proposals from Contractors – November 2011
- Contract Award – February 2012
- Initation of Construction – April 2012



Questions?